

Deng Zhu

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RESEARCH INTERESTS: SPATIAL BIG DATA ANALYSIS

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Skills

English: IELTS (7.0) / CET-6

Programming: NCRE-II (C++) / R、Python、PHP、JavaScript

Certifications: NCRE-III (Networking) / NCAE (GIS)

Education

2016.9 – Present	Graduate Student	Department of Earth System Science	Tsinghua University
2013.9 – 2016.6	B.S. (GPA: 4.06)	School of Geography and Planning	Sun Yat-Sen University
2014.9 – 2016.6	Minor	School of Math	Sun Yat-Sen University

Research

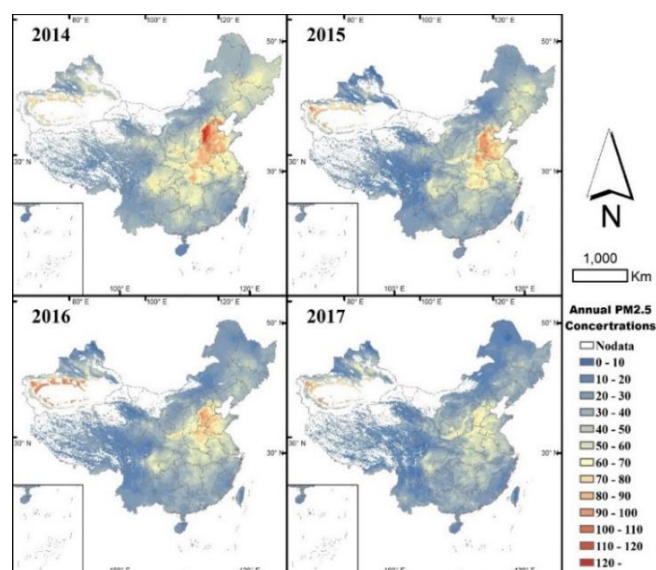
Fine-resolution Ground-level PM_{2.5} Estimations in China 2014-2017

Highlights:

- Prepare crawler program to regularly download air quality data and satellite remote sensing data, and automatically derive daily PM_{2.5} concentration;
- Constructing a spatio-temporal model with $R^2 \approx 0.7$;
- With a spatial resolution of 4 km.

Findings:

- The annual mean PM_{2.5} concentrations over China decreased by years, from 42.92 $\mu\text{g}/\text{m}^3$ in 2014 to 28.76 $\mu\text{g}/\text{m}^3$ in 2017;
- Over 30% people in the Beijing-Tianjin-Hebei region lived with the PM_{2.5} concentrations $> 100 \mu\text{g}/\text{m}^3$.



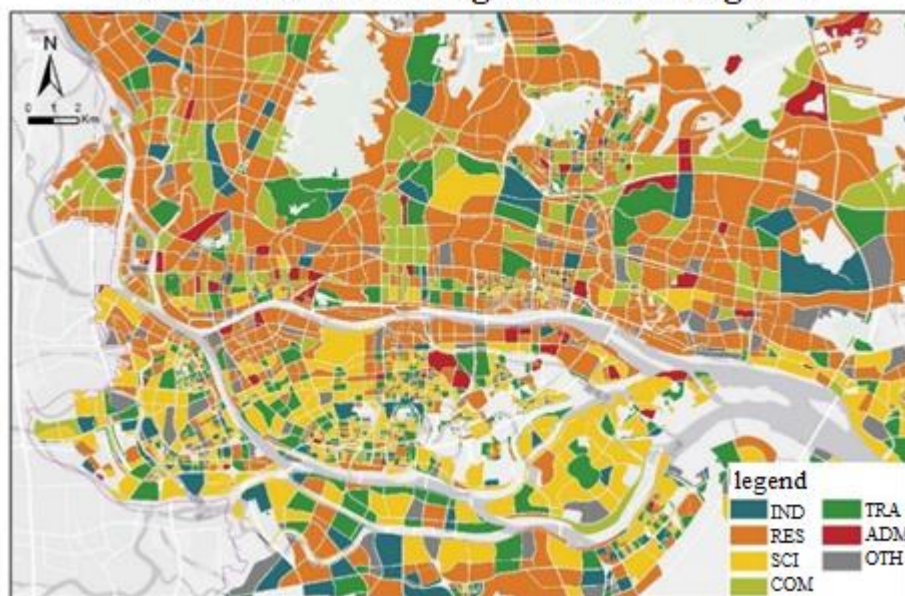
🌐 **Floating car data processing model based on Hadoop-GIS tools**

Introducing a spatial framework into the Hadoop platform, which enabled Hadoop to have spatial analysis capabilities and automatically convert it to MapReduce parallel processing. Experiments showed that Hadoop-GIS could effectively process floating car data (FCD). Hadoop-GIS was more efficient than traditional GIS data processing models. Taking aggregation analysis as an example, the processing time was reduced by over 99%.

* Z. Deng and Y. Bai, "Floating car data processing model based on Hadoop-GIS tools," 2016 Fifth International Conference on Agro-Geoinformatics (Agro-Geoinformatics), Tianjin, 2016, pp. 1-4.

🌐 **Research on the Correlation between Urban Structure and Crowd Emotions using Multi-source Big Data: A Case Study in Guangzhou**

Functional Area Recognition in Guangzhou



The team crawled multi-source big data from network, such as Baidu POIs data, Sina Weibo data, Open OSM (OpenStreetMap) road network data, and Guangzhou high-resolution remote sensing image. We introduced the object-oriented classification, the semantic Dirichlet distribution model and artificial neural networks to classify the city partitions into functional areas. At the same time, the crowd emotions were recognized in different functional areas, and the correlation between urban functional zoning and crowd emotions was obtained.

More information: <http://www.geosimulation.cn/gis4win/main.html>.

🌐 **The Simulation Research of Burglary Crime Based on Multi-Agent Model: A Case Study of DP Peninsula**

Introducing the multi-agent model into urban crime research, to present a simulation of the spatio-temporal interaction process of the subject of criminal behavior on the micro level. The spatial and temporal distribution pattern of crimes at the macro level provides scientific support for in-depth understanding of the crime mechanism.